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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>7</sup> : <b>A61K 7/047, 7/50, C09D 9/00, C11D 7/26</b>		<b>A1</b>	(11) International Publication Number: <b>WO 00/45776</b>
			(43) International Publication Date: 10 August 2000 (10.08.00)
(21) International Application Number: <b>PCT/SE00/00108</b>			(81) Designated States: AE, AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), DM, EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KR (Utility model), KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
(22) International Filing Date: 20 January 2000 (20.01.00)			
(30) Priority Data: 9900155-4 20 January 1999 (20.01.99) SE			
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<b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>			
(54) Title: <b>AGENT FOR REMOVING ADHESIVE PRODUCTS</b>			
(57) Abstract  Composition for removal of nail polish, plaster, adhesives, discolourations or other adhesive products on the skin and/or nails, which to at least 20 % includes one or more esters of one or more natural oils, which further includes one or more synthetic esters, and which is substantially free from volatile solvents. The invention also refers to a composition of the same type for paintbrush wash and/or removal of industrial paint or other adhesive products on objects.			

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## AGENT FOR REMOVING ADHESIVE PRODUCTS

## TECHNICAL FIELD

- The present invention refers to a composition for the removal of nail polish, adhesive,  
5 glue, discolourations or other adhesive products on skin and/or nails, which composition do not contain any volatile solvents. The invention also refers to a composition for removal of colour, varnish or other adhesive products on objects.

## TECHNICAL STANDPOINT

- 10 The most common conventional compositions for removal of nail polish are volatile solvents, such as acetone, or ketone derivatives, with or without the addition of for example oil, the possible oil addition having the purpose to reduce dehydration of the skin and the nails. It also occurs that perfume is added to moderate the smell of solvent.
- 15 Due to an increased environmental awareness and thereby increased demands on reduction of the outlet of solvents efforts have been made to replace acetone with other compounds. A closer examination of many of the present nail polish removal compositions on the market today presented as "acetone free" reveals that acetone has  
20 been replaced by other solvents which are as harmful as acetone to the environment, often different types of ketones, for example methyl ethyl ketone. Only in Sweden solvents in nail polish removal compositions result in approximately 60 tons of emissions each year.
- 25 Other, related problems with conventional solvent based nail polish removal compositions are that they as a consequence of repeated use cause bleached and fragile nails, involve a risk for chronic problems due to inhalation of organic solvents together with that they are inflammable.
- 30 One problem encountered during the development of alternative, to the environment more harmless compositions, is that today's nail polishes become more difficult to remove, since they through development have been made better, often with a hardening effect, to prevent undesired wear of the nail polish.
- 35 A known nail polish remover, based on conventional solvents such as acetone, is disclosed in GB 884 626. In that patent is also mentioned that the compositions can be designed (prepared) as an emulsion, by the addition of a lipophilic ingredient, for

example one or more of different oils or fatty acid esters.

Another known nail polish remover, also based on solvents, is disclosed in DE 43 19 913, wherein it is mentioned that as an additive different types of (synthetic) esters can  
5 be used.

From JP 10-36227 (abstract) it is known to use the compounds isopropylmyristate, 2-ethylhexylpalmitate and isobutyloctanoate for removal of water based nail polish, these compounds being inflammable, volatile solvents which furthermore are irritating,  
10 allergenic and poisonous to water organisms.

In EP 179 675 there is shown, apart from a number of other compositions, a solvent for nail polish. The composition includes triglycerides ("composition lipidique") which solely constitute a minor part of the composition. The major part of the composition  
15 presented in the EP document constitutes inflammable volatile solvents.

US 3,906,106 shows a nail polish remover, which contains 85 % of ethyl acetate, which is an inflammable volatile solvent.

20 In WO 94/16671 and in WO 93/18734 there is shown a composition wherein the disclosed components ethyl lactate and cethyl acetate constitute inflammable volatile or evaporating solvents. Furthermore this composition includes D-limonene, which is a terpene occurring i.a. in natural extracts from oils from e.g. lemon peel. D-limonene has in itself, and in mentioned recipes the characteristics of being inflammable,  
25 environmentally hazardous (among other very poisonous for water living microorganisms), not easy degradable, irritating to the health and has furthermore the duty of marking.

JP I-216911 (Abstract) along with WO 89/07931 (Abstract) show a composition for  
30 removal of nail polish. The solvents mentioned are volatile or evaporating. Moreover, the compositions are irritating and dehydrating, the reason why the addition of oil is proposed. The oil has however no removing effect in itself.

FR 2,645,417 shows a composition for removal of nail polish which primarily contains  
35 acetone, which is an inflammable and volatile solvent.

To sum up, all the above mentioned documents show compositions including

inflammable volatile solvents, which result in air pollution and which are dehydrative and possibly allergenic to the skin.

- It is further known from SE 504 066 to use one or more lower alkyl esters of fatty acids, for example rape-oil methyl ester, for paintbrush wash and/or removal of paint, such as linseed oil paint, acrylate paint, alkyd oil paint or alkyd/acrylate paint on objects. It is mentioned that the esters should act for 1-2 hours, whereafter the composition is washed off by denaturated alcohol, an aqueous tartaric acid solution or sodium bicarbonate, these washing compositions constituting poisonous/irritating and environmentally hazardous chemical solutions. Thus, it would seem impossible for the skilled person of the present invention to use the composition shown in SE 504066 on humans for removal of nail polish having an essentially different formula or other adhesive products.
- As regards the use of the composition shown in SE 504 066 for paintbrush wash or removal of industrial paint on objects, is it also a great disadvantage that the composition needs to act for such a long time, that it has to be removed by the above mentioned washing solutions and that the procedure in certain cases, must be repeated.
- It can also be mentioned that the discovery that oil seed rape methyl esters have the effect to solve industrial paint was made in the middle of the 1980's, in connection with the sale of oil seed rape methyl ester (RME) as drive fuel for tractors and agriculture machines. Shortly after, it was discovered that the paint and plastic dissolving effects of RME caused tremendous problems. It was shown that RME had a dissolving effect on paint and contamination coatings on the tank walls, which in turn caused contamination of the fuel. It was further discovered that RME dissolved plastic packages and fuel hoses, which caused fuel leakage.

#### ACCOUNT OF THE INVENTION AND ITS ADVANTAGES

- The primary object of the present invention is to present a composition for the removal of nail polish, plaster, adhesives, discolourations or other adhesive (chemical) products on skin and/or nails, which composition does not include any volatile solvents. Especially, the invention presents a composition for removal of nail polish and/or care of nails, which composition does not include any volatile solvents.
- This can be achieved by a composition according to claim 1.

The composition is mainly based on natural oils, which preferably are of plant origin and which preferably have a natural nutritional content, including for example different vitamins, the main active substance in the composition being one or more esters, preferably methyl esters, of one or more of these natural oils. The oils are preferably  
 5 selected from the group consisting of oil seed rape oil, almond oil, sunflower oil, olive oil, maize oil, coconut oil, lemon oil and mixtures of oils. A mixture of oils here means a mixture of natural oils, mainly of plant origin, e.g. conventional so-called food oil. Most preferred is a methyl ester of oil seed rape oil, so-called oil seed rape methyl ester, to which esters of more exclusive oils can be added to increase the exclusiveness  
 10 of the composition and/or to add vitamins etc. Very exclusive compositions can be based substantially on esters of the superior oils, such as almond oil, coconut oil or lemon oil.

The fatty acid part of the ester/esters of natural oils can be one or more aliphatic ( $C_8$ -  
 15  $C_{22}$ ) monocarboxylic acids, preferably ( $C_{12}$ - $C_{22}$ ) monocarboxylic acids. As an example of a possible composition of oil seed rape methyl ester the following is mentioned:

<u>Ester</u>	<u>Amount % by weight</u>
$C_{11}H_{23}COOCH_3$	0-1
20 $C_{13}H_{27}COOCH_3$	0-1
$C_{15}H_{31}COOCH_3$	2-8
$C_{17}H_{35}COOCH_3$	0-6
$C_{17}H_{33}COOCH_3$	50-60
$C_{17}H_{31}COOCH_3$	18-27
25 $C_{17}H_{29}COOCH_3$	6-12
$C_{19}H_{39}COOCH_3$	0-2

The composition may exclusively consist of such ester/esters of natural oils, i.e. up to 100 %. However, according to the invention the composition comprises additives of one  
 30 or more synthetic, organic esters, suitably in an amount of 20-80 %, preferably 30-60 %, even more preferably 35-60 %, this/these suitably comprising: dimethylsuccinate in an amount of 5-30 %, preferably 5-25 % and even more preferably 16-20 % and/or dimethylglutarate in an amount of 20-70 %, preferably 25-60 % and even more preferably 35-50% and/or dimethyladipate in an amount of 3-30%, preferably 3-25 %  
 35 and even more preferably 15-20 %.

Instead of separate additions of dimethylsuccinate, dimethylglutarate and

dimethyladipate as above, a ready-made composition can be added in an amount of 20-80 %, preferably 30-60 % and even more preferably 35-60 % of the composition. Such a ready-made composition is produced by Du Pont and marketed in Sweden by Chematex under the trademark Dibasisk ester (Dibasic ester, article number 1063), also  
5 named DBE. The amount of the three esters can vary in DBE from different producers, but is normally in the intervals 12-30 % dimethylsuccinate, 50-70 % dimethylglutarate and 8-30 % dimethyladiapate.

To give the composition an increased removing effect N-methyl-2-pyrrolidone can also  
10 be added in an amount of 0-5 %, preferably 0-2 % or 0.1-5 %, preferably 0.2-2 %. Alternatively to N-methyl-2-pyrrolidone or in combination therewith, dimethylsulfoxide can be added in an amount of 0-10 %, preferably 0-5 % and even more preferably 0-2 % or 0.1-10 %, preferably 0.2-5 % and even more preferably 0.2-2 %. It has during the development of the invention been found that the addition of N-methyl-2-pyrrolidone or  
15 dimethylsulfoxide is especially advantageous when nail polish should be removed from synthetic nails, but also that it has an effect when removing nail polish from natural nails. An especially advantageous effect is obtained with modern, hardened nail polish. Even alternative auxiliary chemicals in small amounts, within the above mentioned ranges, can be used in the composition. In a composition according to the invention,  
20 which is specifically adapted to allergic persons the use of N-methyl-2-pyrrolidone should be minimised or completely avoided.

The content of esters of natural oils in the composition is at least 20 %, preferably at least 35 % and even more preferably at least 50 %, preferably not more than 80 % and  
25 even more preferably not more than 70 %. The content of esters of natural oils is suitably 20-80 %, preferably 35-70 % and even more preferably 50-70 %.

The composition may also include vitamins, which is specifically preferred when the natural oils on which the composition is based is poor in vitamins. Vitamins added can  
30 include vitamin A, vitamin B, vitamin D and vitamin E. Vitamins can also be added in the form of natural oils which are naturally high in nutritional content, e.g. pure oil seed rape oil or another oil, preferably in amounts of 0.1-5 %. Such an addition of oil can give an extra caring effect on skin/nails.

35 The composition is preferably non-perfumed and not tested on animals.

Conventional nail polish, which primarily is intended to be removed by means of the

composition according to the invention, include volatile solvents such as ketones, for example acetone, methyl ethyl ketone and the like, acetic acid butyl esters, for example butyl acetate, ethyl acetate and the like. The composition according to the invention is also active on nail polish based on similar types of volatile solvents.

5

Conventionally nail polish includes compounds from the group consisting of butyl acetate (an aliphatic ester), ethyl acetate (an aliphatic ester), acetone, methyl ketone, nitrocellulose, toluene (minimal amounts), dibutyl ftalate, camfora, Steralkonium Hectorite. The development within the area has been towards more and more hazardous solvents, to obtain stronger nail polish.

10

In use the composition is applied to the nails, the composition advantageously being provided in disposable napkins impregnated with the composition, which disposable napkins are individually packed in cover wrapped packages or packed in resealable multipack. It has proved to be specifically advantageous to use disposable napkins based on fibres, especially of cotton, since cotton has a natural capacity to absorb the dissolved nail polish. After a few seconds the nail polish may be wiped off. After the treatment the nails may, if desired, be painted again with nail polish, without any further type of cleansing. The consumed disposable napkin is compostable and degradable to more than 90 %.

15

20

The composition has also proved to be active in removing other types of unwanted, adhesive (chemical) products which one more or less unintentionally may get on the skin and/or the nails. Such products can e.g. be remainders of adhesives, jointing material, cement, binding agent, hardener, putty and other organic compounds, industrial paints or varnishes, remainders of plaster or discolourations on the skin/nails, which are difficult to remove by common soap and water.

25

A composition according to the invention for removal of plaster, adhesives, discolourations or other adhesive products on skin/nails is very suitable to be used in nursing or in workshops, construction sites or other similar working places. As regards the plaster removing effect the composition has a great advantage in that it is not irritating to the skin, since many people do get skin problems in connection with the use of or the removal of plasters.

30

The composition may possibly, when intended to be used on the skin, be mixed with an abrasive, e.g. in the form of pumice or plastic pellets, to increase the removing effect.

35



Possibly, the composition may be formed as a paste.

Since the composition is based on natural products, the colour may vary without the effect of the product being affected.

5

The main advantages of the composition are the fact that it is not irritating, is environmentally adapted, is not based on volatile solvents, does not evaporate and is not inflammable. According to existing regulations it is not necessary to mark such products.

10

It has also surprisingly been found during the development of the invention, that the composition has a treating/caring effect on the nails and the cuticles, whereby these after repeated treatments become strong and healthy. The reason for this seems to be the softening, lipid character of the esters and its natural content of vitamins and trace elements etc. Thus the composition has a double effect: nail polish removing as well as curing, whereby the user will save time and money in avoiding to spend separate time on curing the nails.

15

#### EXAMPLE 1

- 20 As an example of a composition according to the invention for removal of nail polish or other adhesive chemicals on skin and/or nails, the following preferred formula is given:

Oil seed rape methyl ester	55%
Dibasic ester	44-44.5%
25 N-methyl-2-pyrrolidone	0.5-1%

N-methyl-2-pyrrolidone can also be replaced with another suitable chemical additive or be completely excluded.

- 30 It has further been found during the development of the invention that the composition also may be utilised for removing other types of varnishes or paints used within the industrial area, in any case varnishes and paints on metals or metal alloys. According to one aspect the varnish or the paint, which is intended to be removed, may include a hardener. It may be especially interesting to use the composition for removal of
- 35 varnish/paint on metal sheet, e.g. car metal sheet, thus renovation of veteran cars etc. being an applicable area. In this type of industrial application it may be appropriate to add N-methyl-2-pyrrolidone and/or dimethylsulphoxide and/or another effect improving

chemical additive in an increased amount, however preferably below 50%, e.g. 0-30% or 0-20% of each or one of the two, preferably at a minimum of 1% and under 50%, more preferably 5-30% or 5-20%.

- 5 The invention also concerns a composition for paintbrush wash and/or removal of industrial paint or other adhesive (chemical) products on objects, according to the claims.

- Examples of industrial paints, which may be removed are paints within the group
- 10 consisting of alkyd or alkyd oil paint, powder varnishes, emulsion paints, acetone varnishes/paints or varnishes/paints based on other ketones, rust preventive paints, limewash, glue paint, alkyl paints, acrylate paints, alkyd/acrylate paints, linseed oil paint, asphalt paints, plastic paints. Alkyd or alkyd oil paints, those based only on white spirit as well as those including additions of other natural oils, e.g. linseed oil, pine oil,
- 15 soy been oil, fish oil or Chinese wood oil, may be removed by the composition according to the invention.

- Examples of other adhesive products on objects, which may be removed by the composition according to the invention are products from the group consisting of glue,
- 20 plastics, binding agents, putty, jointing material, asphalt, cement or other filling material. In this connection the composition may also be used to wash e.g. tools to be used in connection with the above mentioned products.

#### EXAMPLE 2

- 25 As an example of a composition according to the invention for the wash of paintbrushes and/or removal of industrial paint or other adhesive products the following preferred composition is presented:

Oil seed rape methyl ester	51%
30 Dibasic ester	35%
N-methyl-2-pyrrolidone	14%

- The composition according to the invention for paintbrush wash or removal of industrial paint on objects present, as compared to SE 504066, the advantages that the
- 35 composition due to the additives to the ester/esters of the natural oils, acts very fast in one treatment step only, after which the dissolved paint may be easily wiped off with a cloth (preferably a cotton cloth). The composition according to the invention is also

active on other types of varnishes or paint than those specified in SE 504 066.

The invention is not restricted to the above mentioned embodiments, but may be varied within the scope of the patent claims. All the %-ranges mentioned are intended to mean  
5 % by weight.

## CLAIMS

1. Composition for the removal of nail polish, plaster, adhesives, discolourations or other adhesive products on skin and/or nails characterized in that it, to at least 20 %, includes one or more esters of one or more natural oils; that it further includes one or more synthetic esters; and in that the composition is substantially free from volatile solvents.
2. Composition according to claim 1, characterized in that said adhesive products include at least one product from the group consisting of nail polish, adhesives, jointing material, cement, binding agents, hardener, putty or other organic preparations, industrial paints or varnishes, parts of plasters or discolourations on skin/nails.
3. Composition according to claims 1 or 2, characterized in that it is a nail polish remover which, to at least 20 %, includes one or more esters of one or more natural oils, which further includes one or more synthetic esters and is substantially free from volatile solvents.
4. Composition according to any of the above claims, characterized in that said one or more esters, or the main part thereof, is a methyl ester/methyl esters.
5. Composition according to any of the above claims, characterized in that said natural oil/oils are of plant origin or substantially of plant origin, the oil/oils preferably being selected from the group consisting of oil seed oil seed rape oil, almond oil, sunflower oil, olive oil, maize oil, coconut oil, lemon oil and mixtures of oils.
6. Composition according to any of the above claims, characterized in that it includes, to at least 35%, preferably at least 50%, preferably most 80% and even more preferably most 70%, one or more of said esters from one or more natural oils.
7. Composition according to claim 1-5, characterized in that it, to 20-80%, preferably 35-70% and even more preferably 50-70%, includes said one or more esters of one or more natural oils.

8. Composition according to any of the above claims, characterized in that said one or more synthetic esters include a dibasic ester in an amount of 20-80%, preferably 30-60% and even more preferably 35-60%.
- 5 9. Composition according to any of claims 1-7 characterized in that said one or more synthetic esters include dimethylsuccinate in an amount of 5-30%, preferably 5-25% and even more preferably 16-20%, and/or dimethylglutarate in an amount of 20-70%, preferably 25-60% and even more preferably 35-50% and/or  
10 dimethyladipate in an amount of 3-30%, preferably 3-25% and even more preferably 15-20%.
10. Composition according to any of the above claims, characterized in that it further includes N-methyl-2-pyrrolidone in an amount of 0-5%, preferably 0-2% and/or dimethylsulphoxide in an amount of 0-10%, preferably 0-5% and even more  
15 preferably 0-2%.
11. Composition according to any of the claims 1-9, characterized in that it further includes N-methyl-2-pyrrolidone in an amount of 0.1-5%, preferably 0.2-2%, and/or dimethylsulphoxide in an amount of 0.1-10%, preferably 0.2-5% and  
20 even more preferably 0.2-2%.
12. Composition according to any of above claims, characterized in that it further includes one or more added vitamins, preferably selected from the group consisting of vitamin A, vitamin B, vitamin D and vitamin E.  
25
13. Composition according to any of the above claims, characterized in that it further includes an addition of one or more natural oils which are naturally high in nutritional content, preferably pure seed rape oil, preferably within the range of 0.1-5%.  
30
14. Composition according to any of the above claims, characterized in that the composition is absorbed in disposable napkins, preferably fibre based disposable napkins, more preferably of cotton.
- 35 15. Use of one or more esters from one or more natural oils for removal of nail polish or removal of plaster, glue, discolourations or other adhesive products on skin and/or nails.

16. Use according to claim 15 characterized in that said one or more esters of one or more natural oils are used in mixtures with one or more synthetic esters with substantially no addition of volatile solvents.
- 5
17. Composition for paintbrush wash and/or removal of industrial paint or other adhesive products on objects characterized in that it, to at least 20 %, includes one or more esters of one or more natural oils; that it further includes one or more synthetic esters; and in that the composition is substantially free from
- 10 volatile solvents.
18. Composition according to claim 17 characterized in that it is adapted for removal of industrial paint from the group consisting of alkyd or alkyd oil paints, powder varnishes, emulsion paints, acetone varnishes/paints or varnishes/paints
- 15 based on other ketones, rust preventive paints, limewash, glue paint, alkyl paints, acrylate paints, alkyd/acrylate paint, linseed oil paint, asphalt paints and plastic paints.
19. Composition according to claim 17 characterized in that it is adapted for removal of products from the group consisting of adhesives, plastics, binding
- 20 agents, putty, jointing material, asphalt, cement or other filling material.
20. Composition according to any of claims 17-19 characterized in that said one or more esters or the main part thereof is a methyl ester/methyl esters.
- 25
21. Composition according to any of claims 17-20, characterized in that said natural oil/oils are of plant origin or substantially of plant origin, the oil/oils preferably being selected from the group consisting of oil seed oil seed rape oil, almond oil, sunflower oil, olive oil, maize oil, coconut oil, lemon oil and mixtures of
- 30 oils.
22. Composition according to any of claims 17-21, characterized in that it includes, to at least 35%, preferably at least 50%, preferably most 80% and even more preferably most 70%, one or more of said esters from one or more natural oils.
- 35
23. Composition according to claim 17-21, characterized in that it, to 20-80%, preferably 35-70% and even more preferably 50-70%, includes said one or more

esters of one or more natural oils.

24. Composition according to any of claims 17-23, characterized in that said one or more synthetic esters include a dibasic ester in an amount of 20-80%, preferably 30-60% and even more preferably 35-60%.
25. Composition according to any of claims 17-23, characterized in that said one or more synthetic esters include dimethylsuccinate in an amount of 5-30%, preferably 5-25% and even more preferably 16-20%, and/or dimethylglutarate in an amount of 20-70%, preferably 25-60% and even more preferably 35-50% and/or dimethyladipate in an amount of 3-30%, preferably 3-25% and even more preferably 15-20%.
26. Composition according to any of claims 17-25, characterized in that it further includes N-methyl-2-pyrrolidone and/or dimethylsulphoxide in an amount less than 50%, preferably at least 1% and less than 50%, more preferably 5-30% or 5-20%.
27. Composition according to any of claims 17-26, characterized in that the composition is absorbed in disposable napkins, preferably fibre based disposable napkins, more preferably made of cotton.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/00108

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A61K 7/047, A61K 7/50, C09D 9/00, C11D 7/26

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A61K, C09D, C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 9910438 A1 (HENKEL KOMMANDITGESELLSCHAFT AUF AKTIEN), 4 March 1999 (04.03.99) --	1-27
X	EP 0755987 A1 (CFM GMBH), 29 January 1997 (29.01.97) --	1-27
X	WO 9627642 A1 (SVENSKA RAPSOLJEBOLAGET AB), 12 Sept 1996 (12.09.96), page 2, line 4 - page 3, line 10, The claims --	1-27
X	EP 0616016 A1 (GEORG SCHEIDEL JR. GMBH), 21 Sept 1994 (21.09.94), page 2, line 54 - page 3, line 7, claims 1-6 --	1-27



Further documents are listed in the continuation of Box C.



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Date of the actual completion of the international search

18 April 2000

Date of mailing of the international search report

16 -05- 2000

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/00108

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	STN International, File CAPLUS, CAPLUS accession no. 1993:11526, document no. 118:11526, Szurok, Istvan et al; "Nail lacquer remover", HU, A2, 60427, 19920928  --	1-27
X	STN International CAPLUS, CAPLUS accession no. 1998:421441, Document no. 129:71971, Sawada, Yasumasa: "Hand soaps containing liquid esters"; JP, A2, 10175847, 19980630  --	1-27
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